PATENT SPECIFICATION (11) 1 400 766

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(21) Application No. 412/72 (22) Filed 17 June 1972

(31) Convention Application No. 7 126 043 (32) Filed 15 July 1971 in (33) France (FR)

(44) Complete Specification published 23 July 1975

(51) INT. CL.[8] E02B 15/04

(52) Index at acceptance E1H 11

(54) VARIABLE DRAUGHT FLOATING BOOM

(71) We, PNEUMATIQUES, CAOUTCHOUC MANUFACTURE ET PLASTIQUES KLEBER-COLOMBES, a French Body Corporate, of Place de Valmy (92) Colombes, France, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement: —

The present invention relates to a floating, anti-pollution boom or barrier for arresting or collecting bodies or substances floating on the surface of water of the type comprising a skirt supported by buoyancy members.

All existing floating booms of this type have a skirt whose depth is permanently fixed when the boom is manufactured and which is the same along the whole length of the boom. As the boom is towed into position, not only does the skirt serve no purpose but it even constitutes a hinderance by reason of its drag, which produces both resistance to forward movement and a reduction in ease of handling. Moreover, it has been found that in operation, sometimes the depth of the skirt at certain places is ill-adapted to the particular conditions existing, whereas the depth of the skirt is found to be suitable at other parts of the boom under other conditions. This is the case with, for example, floating booms which are moved over the water to sweep a polluted surface and which are arranged in a V-shape to form a collecting pocket for the contaminants.

An object of the present invention is to reduce these drawbacks by enabling the skirt depth of the boom to be altered.

To this end, the invention consists in a floating anti-pollution boom or barrier for arresting bodies or substances floating on the surface of water, comprising a ballasted skirt supported by one or more buoyancy members, and a plurality of discrete adjusting means spaced throughout the length of the boom each regulating the depth of a portion of the skirt so as to alter the effective depth of the boom or different locations. Thus the invention enables each part of the boom to be adjusted to the conditions in which it is placed. As used herein, skirt depth means the amount of skirt depending below the buoyancy member(s).

In one embodiment of the invention reducing the skirt depth, and thus reducing the draught, is effected by a plurality of spaced members, such as ropes or straps or similar members (hereinafter referred to simply as straps) connecting the bottom of the skirt to the buoyancy member which is positioned above it; the length of these straps being adjustable so that the skirt depth may be altered thereby, the draught of the boom being variable by varying the depth of the skirt with respect to the buoyancy member(s) between a maximum value, when the full depth of the skirt is used, and a minimum value which is practically nil. This latter position may be selected, for instance, in order to tow the boom rapidly to its position of use with the minimum of resistance to towing and improved ease of handling.

The straps are flexible members, for example, strips of a textile, which are preferably rot-proof and inert to the water in which the boom is situated.

The straps with which the boom is equipped have other advantages; for example, they allow the boom to be drawn along and/or additional ballasting means to be easily positioned, such as a chain extending between the straps at the lower part of the skirt.

In order that the invention may be more readily understood, reference will now be made to the accompanying drawings which

schematically illustrate floating booms according to the invention and in which:—

Figure 1 is a cross-section through one embodiment, the skirt depth being at a maximum,

Figure 2 is a section through the boom of Figure 1, the skirt being in another position,

Figure 3 is another section through the boom of Figure 1, the skirt being in yet another position,

Figure 4 is a cross-section through a second embodiment, the skirt depth being at a maximum,

Figure 5 is a section through the boom of Figure 4, the skirt being in another position, and

Figure 6 is another section through the boom of Figure 4, the skirt being in yet another position.

The boom illustrated in Figure 1 comprises a skirt 10 equipped with a ballasting member, for example, a chain 12, and supported by a buoyancy member or chamber inflated with air or filled with a solid material of low density. The skirt is formed by the lower portion of a rectangle of rubberised woven fabric the upper portion 11*a* of which forms the chamber 11 by bonding or sewing to another portion of fabric 11*b*.

At various positions, for example, every metre, straps 13 link the lower part of the skirt 10 to the part of the chamber 11 opposite the point at which the skirt 10 joins the chamber 11. In the embodiment of Figure 1 the end 13*a* of the strap 13 is inserted into an eyelet formed in a strip of fabric carried by the chamber 11 (the said strip also serving to hold together the portions 11*a* and 11*b*) and it is held in place by a knot 14 which prevents it escaping from this eyelet. It is fixed to the lower part of the skirt by a ring 15 fixed to its end 13*b*, which ring is attached to another ring 16 which is itself fixed to the skirt and to which is attached the ballasting chain 12b. The strap could alternatively be fixed by bonding or sewing or in any other convenient manner.

The linking of the strap 13 to the chamber 11 allows it to slide in the eyelet; by pulling on the end 13*a* of the strap and by fixing the latter in its new position by a simple knot the skirt depth is reduced.

Figures 2 and 3 show the boom of Figure 1 with two different positions of the skirt 10 resulting from a reduction in the length of the linkage between the lower part of the skirt 10 and the chamber 11 achieved by pulling the strap 13 in the direction of the arrow F (Figure 2). As is seen in Figure 2, the skirt having been raised and having carried the chain 12 with it, the chamber turns until the centre of gravity of the assembly is on the vertical line through the centre of buoyancy. In addition, the skirt 10, instead of being vertical, has become inclined, which experience has shown to be a condition favouring the arresting of polluting substances.

Figure 3 shows the skirt 13 of the boom entirely drawn-up and rolled around half the circumference of the chamber. Since the size of the skirt is the same as half the circumference of the chamber, the latter has turned through substantially 180°. When the skirt is in this position the boom has minimum drag and offers the greatest ease of handling.

In this embodiment, the skirt depth may have any value whatever between no depth at all (Figure 3) and a maximum depth corresponding to the vertical position of the skirt; the skirt may be inclined, which is desirable. Moreover, as has been indicated, the straps allow supplementary ballast to be easily fixed either to the whole of the boom or only to certain parts of it. This is particularly important because, when the boom is in position, it is frequently essential to add or take away ballast either along the whole length or only certain parts of it. Hence, in the boom of Figures 1 and 3, the straps allow additional ballesting devices, such as a chain, to be threaded through in the longitudinal direction of the boom, it then being positioned between the skirt and the straps and being held in place by the latter.

The boom illustrated in Figures 4, 5 and 6 is another embodiment of the invention. On each of a plurality of spaced transverse planes passing through the straps 19, on the periphery of the chamber and possibly on the skirt 17, are located several buckles 20 or similar members such as rings or hooks to one of which is fastened the end 19*a* of the respective strap. Thus, the ends 19*a* of the straps are fastened to buckles which correspond to the required depth of the boom. Figure 5 shows an intermediate position of the skirt 17 in which the end of a strap 19 is fixed to the buckle 20*a* positioned (Figure 4) on the skirt 17. Figure 6 shows the skirt 17 fully rolled up around the chamber 18, the strap 19 being fixed to the final buckle 20*b* which is also situated on the skirt below the buckle 20*a*.

Whatever the maximum depth of the skirt it may be rolled-up until it is completely so rolled. This has the advantage of making possible a design of boom in which the skirt depth can vary between very different levels.

WHAT WE CLAIM IS:—

1. A floating anti-pollution boom or barrier for arresting bodies or substances

floating on the surface of water, comprising a ballested skirt supported by one or more buoyancy members, and a plurality of discrete adjusting means spaced throughout the length of the boom, each regulating the depth of a portion of the skirt so as to alter the effective depth of the boom at different locations.

2. A boom as claimed in claim 1, wherein the adjusting means comprises straps attached to the lower part of the skirt and to the buoyancy member(s).

3. A boom as claimed in claim 2, wherein a succession of buckles, hooks or similar means is fixed to the buoyancy member(s). and/or the skirt for co-operation with said straps.

4. A boom as claimed in claim 2, wherein each strap slides in an eyelet fixed to the buoyancy member(s).

5. A boom as claimed in any one of the preceding claims 2 to 4, wherein an additional ballasting member is located between the straps at the lower part of the skirt.

6. A boom as claimed in any one of the preceding claims 2 to 5, wherein the skirt is arranged to be wholly or partly rolled-up around the buoyancy member(s) by the straps when the skirt depth is reduced.

7. A floating anti-pollution boom or barrier constructed substantially as hereinbefore described with reference to Figures 1, 2 and 3 of the accompanying drawings.

8. A floating anti-pollution boom or barrier constructed substantially as hereinbefore described with reference to Figures 4, 5 and 6 of the accompanying drawings.

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Chartered Patent Agents.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1975.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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Fig.1

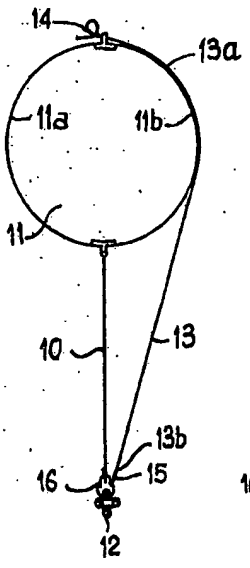

Fig.2

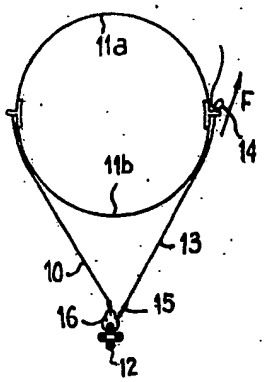

Fig.3

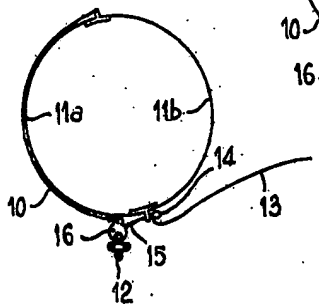

Fig.4

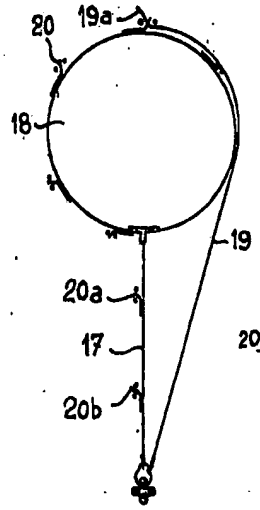

Fig.5

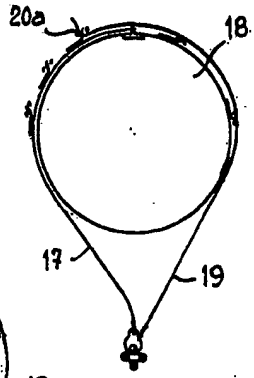

Fig.6